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Minimal Decaying Dark Matter and the LHC

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Decaying Dark Matter is an interesting and viable alternative to the common paradigm of stable Dark Matter. We consider a simple extension of the Standard model with two states, a Dark Matter Majorana fermion and a colored or only electroweakly charged scalar, without introducing any symmetry to stabilize the DM state. We identify the parameter region accounting for an Indirect Dark Matter signal in the reach a of future observations and which can, at the same time, be probed by collider searches. Among the possible scenarios particulary promising is the case in which the DM is produced by the Freeze-in and SuperWimp mechanisms. We point out the different collider signals of this scenario and how it will be possible to measure the relevant couplings in case of a combined Indirect and collider detection.

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